Design and Development of a New Edge Sensor for Web Guiding

Article

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Abstract

Existing edge sensors use the concept of blocking/unblocking to determine web lateral position. The most commonly used sensors employ either ultrasonic or optical signals to detect the web edge position by measuring the amount of signal attenuation due to blocking/unblocking of the signal. The main drawback of this sensing method is nonuniform signal attenuation due to web material variations and opacity. The research in this paper develops a new sensor which utilizes the phenomena of light scattering from the web edge and the directional sensitivity of optical fibers to determine the web lateral position. A collimated light beam is incident on the web edge and scattered light is collected by a linear array of fibers spatially positioned above the web edge. Based on the intensity of light received by each fiber in the fiber array, lateral position of the web is determined. The theory of operation and the development of the sensor is described. Experiments are conducted with different web materials to validate the proposed sensing method. A representative sample of the results are presented and discussed.

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